# Video #21: What is the World's Climate Plan?

## Introduction

{G} Hi, my name is Glenn Weinreb,
and today we're going to look at the {NG}
{video gov't / un / Geneva-Switzerland} United Nations' strategy,
for tackling climate change.

{G} In 1988,
they set up a group of scientists, {NG}
{video scientist / close-up-of-business} to study the climate problem,
and suggest,
solutions.

{G} They named this group {NG}
{Pic IPCC Logo and name} The Intergovernmental Panel,
on Climate Change (IPCC),
{G} and tasked them,
with publishing reports,
every 6 to 7 years. {NG}

{Pic 2 reports} This includes {Pic Science Report} a Science Report,
that estimates,
the average global temperature,
over the next 75 years.

And a {Pic Mitigation Report} Mitigation Report,
that suggests ways,
to reduce,
global warming.

**REFERENCE:** https://en.wikipedia.org/wiki/IPCC_Sixth_Assessment_Report

{G} The primary method,
is called "Decarbonization",
and typically {NG}
{Pic Decarbonization} involves replacing coal, oil and natural gas;
which solar, wind, hydro and nuclear power.

{G} The intent of this video,
is NOT to advocate,
for a specific policy,
but instead, {NG}
{Pic 2 report covers} to summarize their reports.

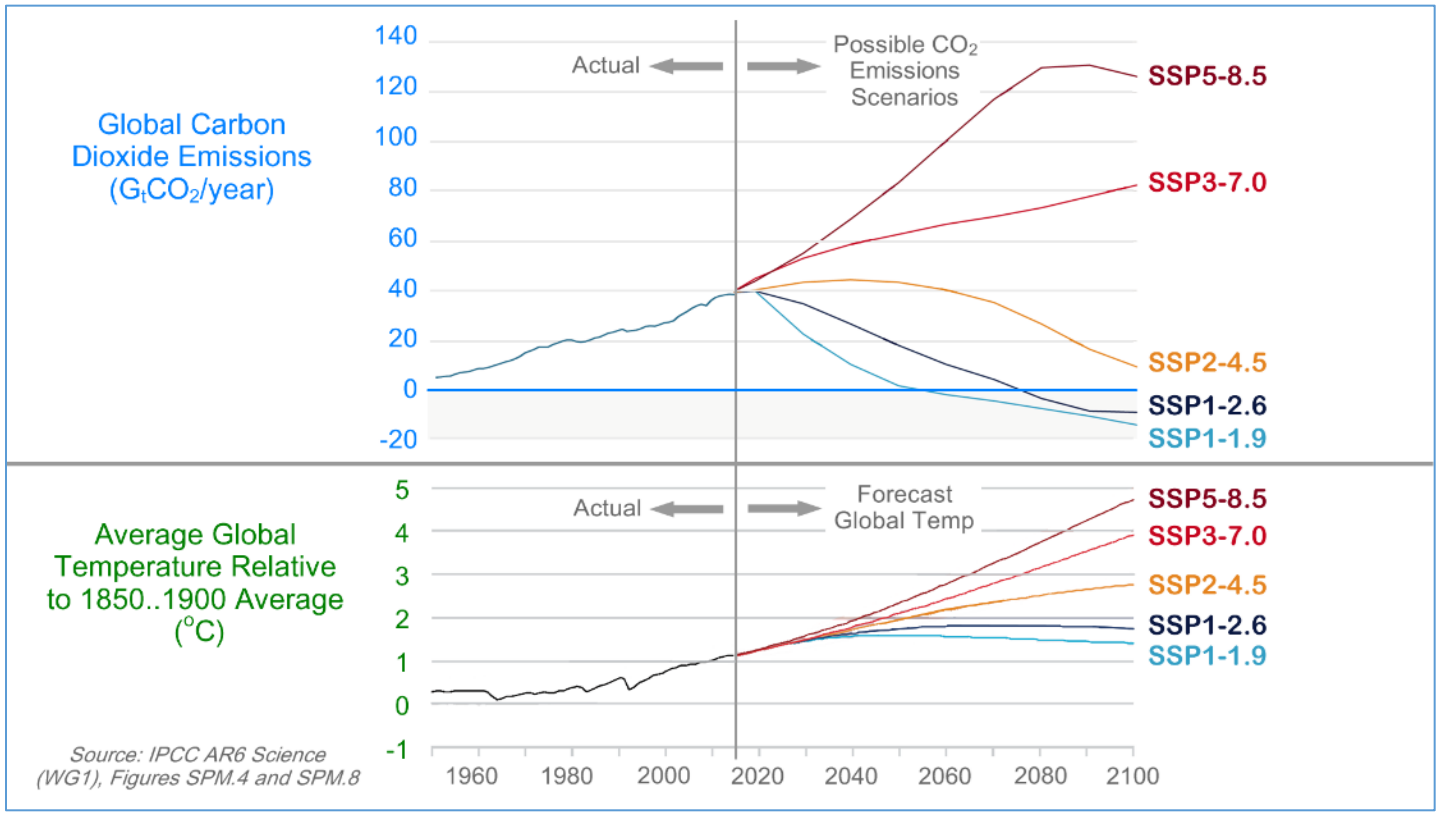
REFERENCE

https://en.wikipedia.org/wiki/Intergovernmental_Panel_on_Climate_Change
Documents\Manhattan2\Non-Profit_Organizations\IPCC\AR6 IPCC Reports\AR6, Working Group 3
https://ourworldindata.org/co2-and-greenhouse-gas-emissions

## The United Nations Science Report

{Pic Programmer at keyboard} Climate scientists,
have developed software,
that estimates,
{Pict earth temperature graph} future,
global temperatures,
given,
{Video smoke / smoking-factory} future,
carbon dioxide emissions.

{Pic GCM} This software is referred to as a,
Global Climate Model,
and,
it is the basis,
{Pic Science Report} for their 2400-page,
Science Report.




{G} The climate models,

evaluate so-called {NG}
{Pic two graphs} SCENARIOS,
FIVE of which,
are shown here.

Each SCENARIO,
includes,
{*} a carbon dioxide emissions plot,
and,
{*} a global temperature plot.

{*} Carbon dioxide emissions,
are specified in units of,
{*} billions of tons,
of carbon dioxide gas,
emitted into the atmosphere,
each year.

{*} And,
global temperatures,
are specified,
in units of,
{*} degrees Celsius INCREASE,
over the last,
150 years.

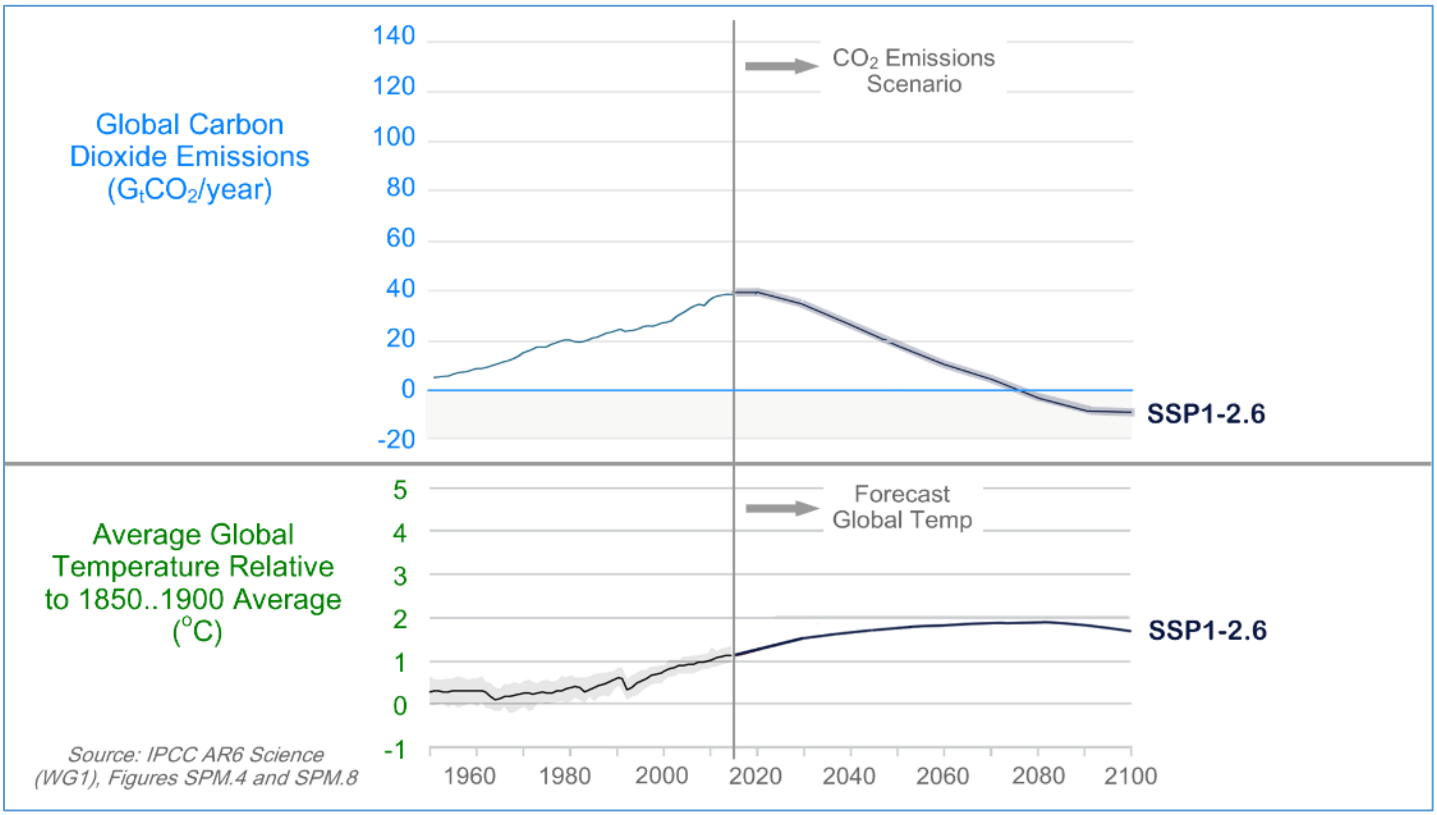
{*} As one can see,
global temperatures in **three** scenarios,
{*} just keep {Pic up} going up,
{*} while **two** scenarios,
{*} are more,
well behaved.

{G} Good behavior,
involves "bending-the-curve," {NG}
{*} which refers to,
temperatures {*} that peak,
and {*} then,
drop back down.

{*} This is in contrast,
to {*} temperatures that {*} just,
runaway.

{Pic labels} Each scenario,
is labeled,
and,
as one can see,
{*} scenario 2.6 {*} is good,
while 4.5,
{*} is bad.

Scenario 2.6




{Pic 2.6} We're going to focus on 2.6,
since it is the easiest way,
{*} to bend-the-curve.

{*} In 2.6,
{*} carbon dioxide emissions {*} reach {*} zero,
within roughly 50 years,
{*} and then go,

negative.

Direct Air Capture

{*} Negative refers to pulling carbon dioxide gas out of the atmosphere,
{*} while positive,
refers to,
putting it in.

{*} Pulling it out is called,
"Direct Air Capture",
{*} or D A C,
for short.

{*} Scenario 2.6 suggests,
there are two phases,
when dealing with,
climate change.

{*} ONE is decarbonization,
while {*} the other is,
Direct Air Capture.

{*} And,
the first phase is easier than {*} the second,
since {*} it costs less.

$8T/year DAC

{Pic Girl Calculator} Ok, but by how much?

{*} Well,
{*} this tiny blip,
refers to {*} extracting 8 billion tons,
of carbon dioxide,
out of the atmosphere,
each year.

{Pic $8T math} Removing {*} one-ton,
typically costs 1000 dollars.

Therefore,
{*} removing 8 billion tons a year,
{*} would {**slow**} cost,
8 trillion dollars,
annually.

{Pic Guy scratching head} To make this easier to comprehend,
we will compare this to,
to the global cost of,
fossil fuel.

{Pic fuel} Each year,
the world typically {*} spends 2.5 trillion dollars on oil,
{*} 1 trillion on coal,
and,
{*} a half trillion,
on natural gas.

{Pic $4T} The total {*} is 4 trillion,
{Pic storm girl} which is half the 8 trillion,
needed for,
Direct Air Capture

{G} In other words,
Direct Air Capture,
is probably,
prohibitively expensive. {NG}

## The Global Warming Problem

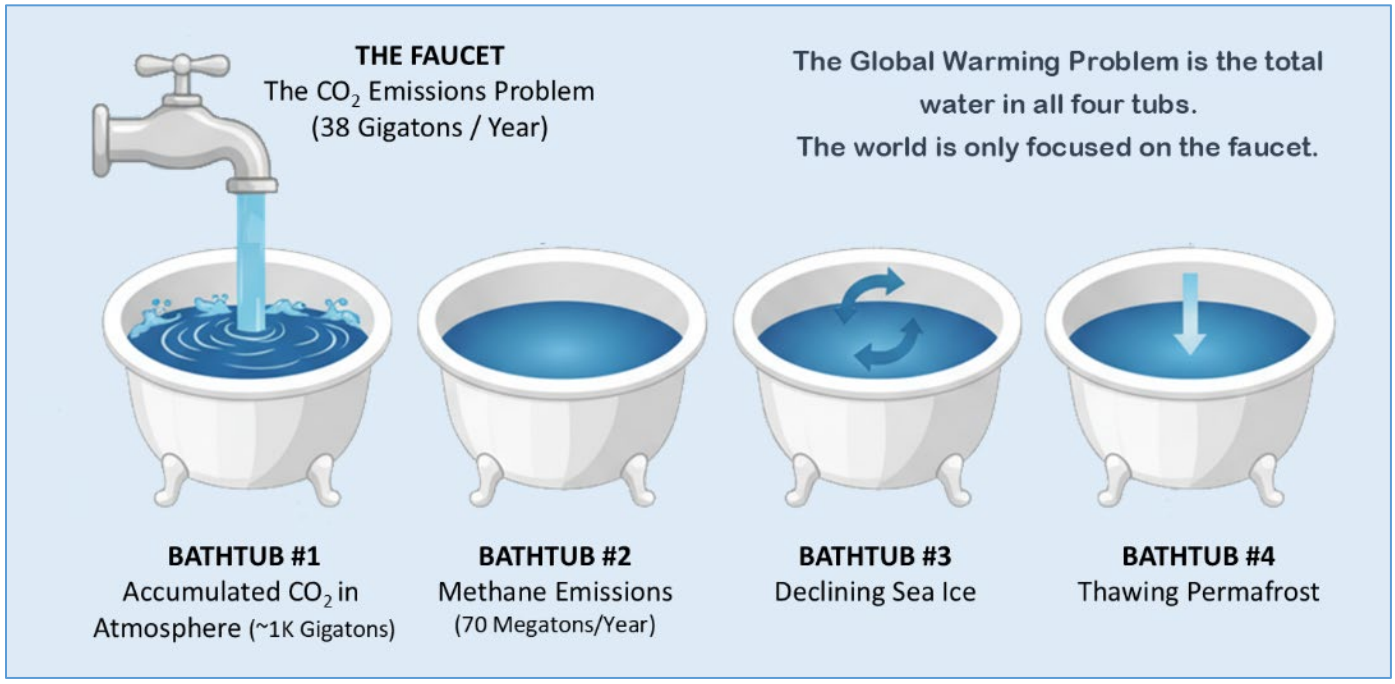
{G} We've been bombarded, {NG}
{*} with the following message:

{SLOW} Carbon dioxide emissions,
cause global warming,
{*} and eliminating these emissions,
{*} will solve,
the climate problem.

{G} However,
this is only,
SLIGHTLY correct. {NG}

## The Bathtub Problem

{Pic 5x Causes} Instead,
global warming is caused by
the excess carbon dioxide,
in atmosphere,
that has been built up,
over the last 150 years,
plus methane emissions,
plus declining sea ice,
etcetera.




{Pic Bathtubs} The climate problem,
is like a faucet,
with several bathtubs.

{*} The faucet,
represents annual,

carbon dioxide emissions,
while {Pic 4 tubs} the water in the tubs,
represents global warming.

More specifically,
{Pic circle faucet} water flow,
from the faucet,
is proportional,
to the amount of carbon dioxide,
emitted,
into the atmosphere,
each year.

{Pic 4 tubs} While the combined water,
in ALL the tubs,
is proportional,
to the increase,
in Earth's temperature,
each year.

{Pic 1st tub} The water in the *FIRST* tub,
is due to 150 years of,
**past** carbon dioxide emissions.

Not one year's emissions.

{Pic no circle} And the water in the other tubs,
is proportional to
{Pic 2nd tub} warming from,
methane emissions,
{Pic 3rd tub} warming from,
declining sea ice,
etcetera.

{Pix Four tubs} Ultimately,
multiple sources of warming,
combine,
and increase,
the planet's temperature.

{Video activism / street-protest} Global policy, media, and activism are all obsessed
{no circle} with slightly {faucet} turning down the faucet,
{no circle} while completely ignoring the fact that
{4x tubs} water **already** in the tubs, is what's
{Video global w / city / 496570_Berlin} causing
catastrophic global warming.

{Pic blip} And the water in the tubs,
shows up,
as {*} a tiny blip,
on a graph,
which refers {*} to,
draining water,
from the first tub.

## Climate Models Are Not Accurate

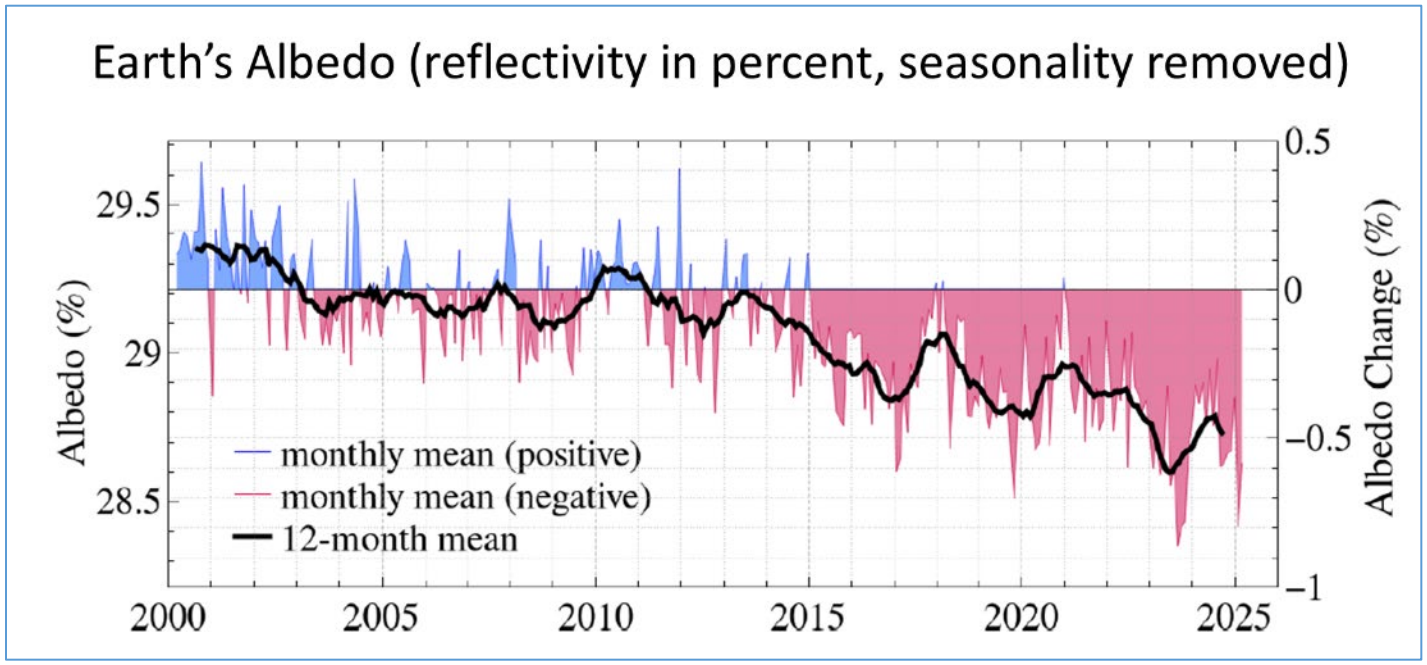
{G} As noted previously,
climate scientists,
have developed software that estimates, {NG}
{*} future,
global temperatures,
given,

{*} future,
carbon dioxide emissions.

{G} And,
unfortunately, {NG}
{Video: activism / silhouette-of-tired-businesswoman} this software is NOT accurate.

{G} We know this,
because it does not predict,
what we see, {NG}
{Pic satellites} with instruments.

For example,
{Pic albedo} the amount of sunlight,
that reflects off,
the top of the atmosphere,
{Pic arrow} has changed significantly,
over the last,
25 years.




{G} And,
this was NOT predicted,
by global climate models.

More specifically, {NG}
{video signs / clocks-spiral-tunnel} they underestimate,
the speed,

{video primal earth / primal-earth-images} at which our planet,
is changing.

{*} In other words,
producing
{*} this temperature profile,
{*} requires getting to zero emissions,
sooner,
than that shown here.

And {*} requires more,
Direct Air Capture,
than that shown here.

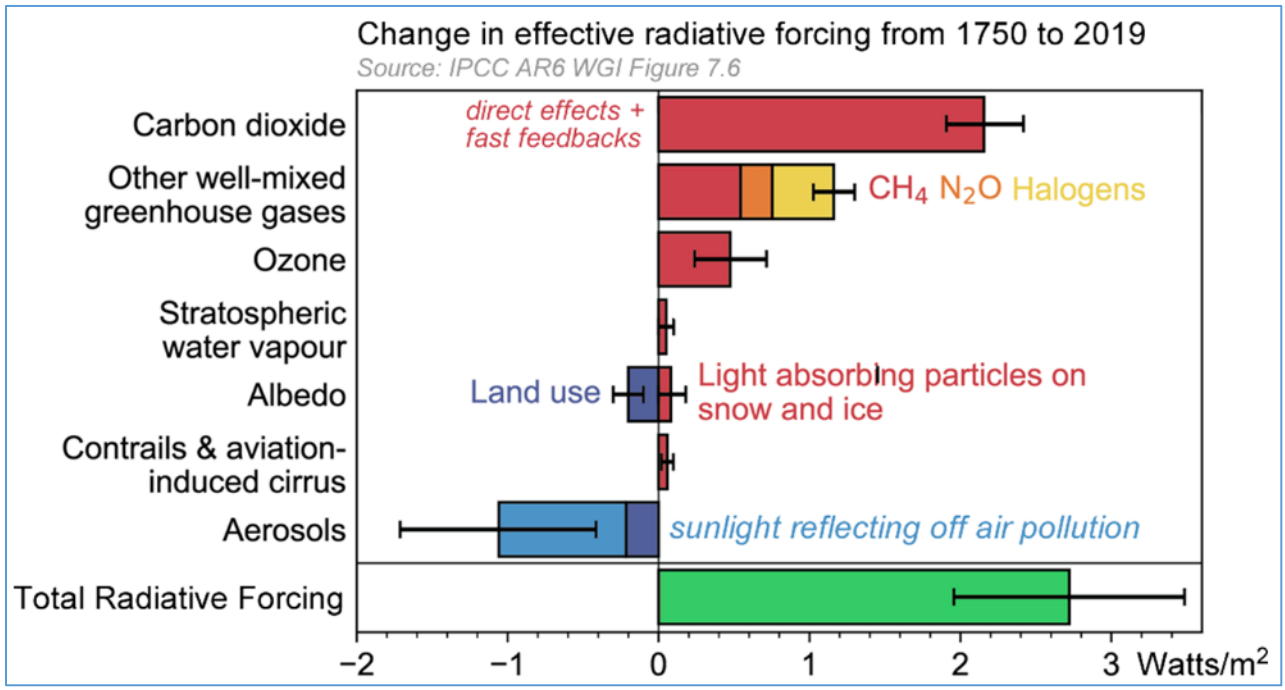
## More money for Research

{G} Ok,
so if the climate models are bad,
does that mean, {NG}
{*} the scientists are bad?

{G} I don't think so.

{G} Instead,
I think
the problem is, {NG}

{video signs / money / money-makes} the lack of financial support,
for key experiments.



{G} Here's an example. {NG}

{Pic RF} This graph,
{*} shows components,
of global warming,
that sum together,
to {*} produce,
TOTAL warming.

And, {*} the blue bar,
indicates how much sunlight,
reflects off,
air pollution.

This offsets global warming,
with cooling.

And,
{*} the magnitude of this parameter,
{*} is unknown,
since it has never been,
measured.

Only estimated.

And this is why {*} we see,
the large error bar.

{G} Ok, so what does,
all of this,
mean? {NG}

{video / signs / money / closeup-of-unrecognizable} Well,
it means
we are not quantifying,
global warming.

{*} And this leads to,
{*} inaccurate,
graphs.

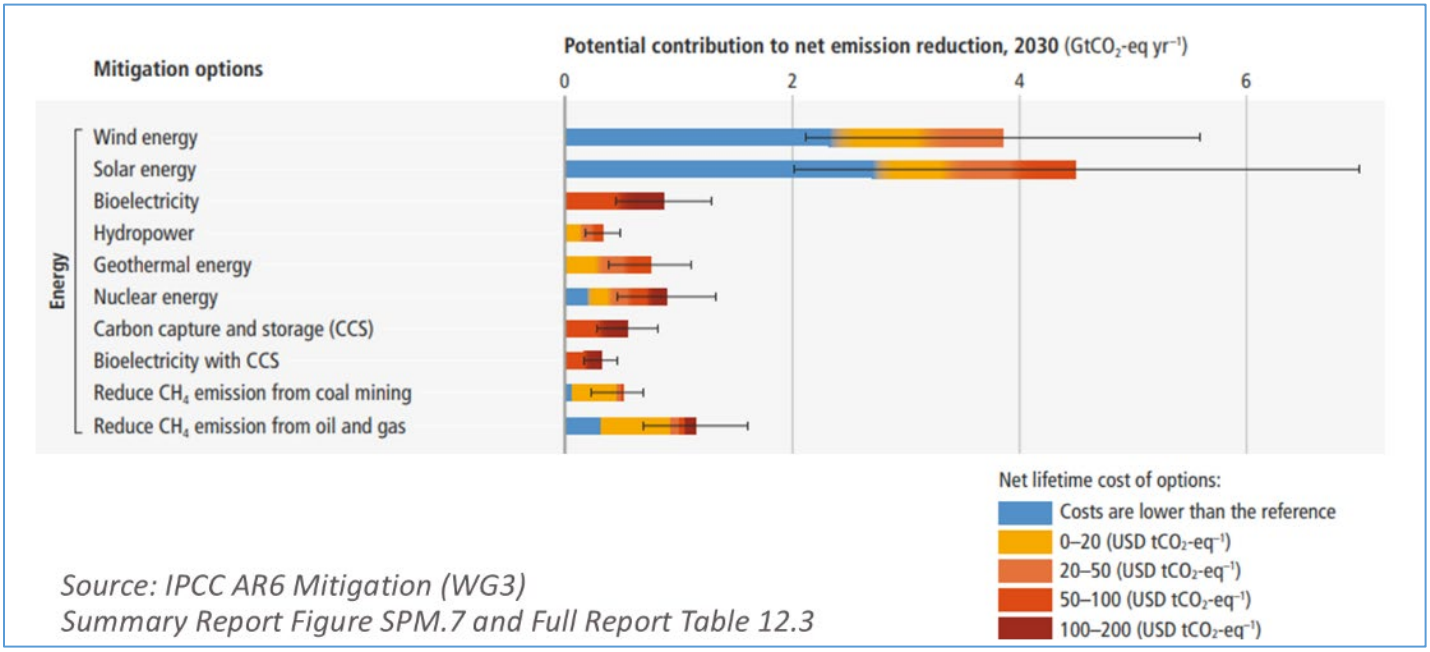
{Pic v8} For details, see Video Number 8.

The Uncertainty of Climate Change [#8]
https://www.youtube.com/watch?v=HoqX7uBaeKU

## United Nations Mitigation Reports

{G} In 2022,
the United Nations' Climate Panel,
published a {NG}
{Pic Mitigation cover} 2000-page report,
that lists,
different ways,
to reduce,
global warming.

{Pic SPM.7, Ar6_WgIII_SummaryReport_Fig_SPM.7.PNG} They summarize,
with this chart,
that shows 42 different,
techniques.




*Source: IPCC AR6 Mitigation (WG3)*
*Summary Report Figure SPM.7 and Full Report Table 12.3*

To make this easier to see,
we focus,
on {*} the top,
of their chart.

Each {*} technique,
is summarized with a bar,
{*} where the length of the bar,
indicates,
the maximum possible decarbonization amount.

{*} And,
the color,
indicates,
the cost.

{*} Decarbonization {*} potential,
is specified in units of billions of tons,
of annual,
carbon dioxide emissions,
reduced.

And {*} cost,
is specified in units of,
dollars per ton,
of carbon dioxide.

{*} In the color chart,
{*} blue refers to negative cost,
which means one saves money,
when they reduce,
carbon dioxide emissions.

{*} Yellow refers to,
0 to 20 dollars cost,
per ton,
of carbon dioxide reduced.

{*} And orange refers to,
20 to 50 dollars,
per ton.

{G} Let's focus on one bar,
to get a better sense,
of how this works. {NG}

{*} Roughly 4 billion tons,
of annual carbon dioxide emissions,
can be ELIMINATED,
{*} by building,
solar farms.

This {*} includes 2.5 billion tons,
at no cost.

And {*} a half billion tons,
at a 0-to-20-dollar per ton cost.

Also,
{*} there is a limit,
to how many solar farms,
one can build.

## The Saturation Problem

{video power / solar / Two-Workers} When building up solar power,
{video power / solar / solar-panels-produce} the amount of electricity from solar panels eventually exceeds
{video city / power meter / analog-electricity-meter} the amount of electricity consumed by customers,
{Pic sunny} when sunny.

{G} If one builds further, electricity is discarded, due to supply from solar, exceeding demand. {NG}

{Pic saturation} This is referred to as "solar saturation," and at this point, solar construction stops.

{video power / solar / something…} Ultimately, there is a limit to how much decarbonization, can be achieved, with solar power.

{video power / wind / 124751_wind_turbine} The same applies, to wind power.

{G} Ok, so what impact would,
solar saturation have on,
GLOBAL carbon dioxide emissions? {NG}

{Video: signs / money / footage-of-young} Well, let's quantify.

{video global warming / cloud-sky-time} The sun burns bright,
about 6 hours,
out of every 24,
{G} which means we can get roughly 25%,
of our electricity,
from solar power. {NG}

{video power / coal / aerial-view-shows} And,
roughly one-third,
of carbon dioxide emissions,
are from,
electrical power generation.

{G} Therefore, building up solar, {NG}
{Pic 1/12 = 1/4 × 1/3} until saturation,
would decrease,
global carbon dioxide emissions,
{*} by approximately 8%.

{G} The Mitigation Report,
came up with,

a similar,
conclusion. {NG}

{*} They estimate maximum decarbonization,
due to {*} solar,
to be {*} 4 gigatons out of 60,
which is about 8%.

{*} And a similar situation exists,
with,
{*} WIND power.

{G} In summary,
solar and wind are helpful,
yet only,
SLIGHTLY. {NG}

## 30-Year Decarbonization

{Pic Report Cover} The Science Report,
{2.6} suggests we should {*} decarbonize to {*} zero emissions,
and then {*} do,
Direct Air Capture.

{*} While the Mitigation Report,
is {*} telling us,
{*} how much,
this would cost.

We can merge these two,
by {Download} downloading their data,
and plotting,
global decarbonization costs,
vs. time.

Graph Assumptions

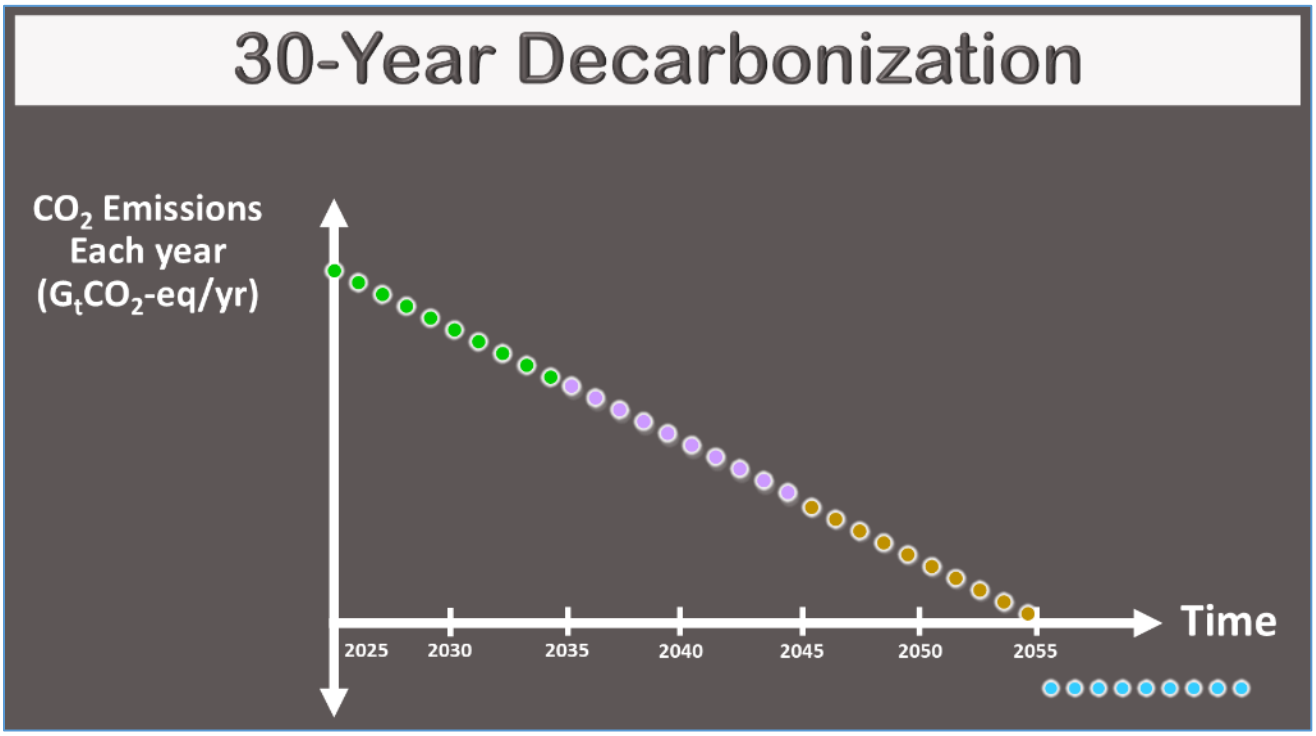
{G} This entails,
several,
assumptions. {NG}

{*} One.

We assume decarbonization occurs at {*} a constant rate,
followed {*} by,
Direct Air Capture.

Two.

We assume {*} emissions decrease,
1/30th per year,
{*} to get to zero,
{*} 30 years from now (as shown in below graph).




And three.

{*} We assume decarbonization occurs,
{*} in lowest cost order,
with {*} the easiest being tackled first,
followed by,
the,
{*} less easy.

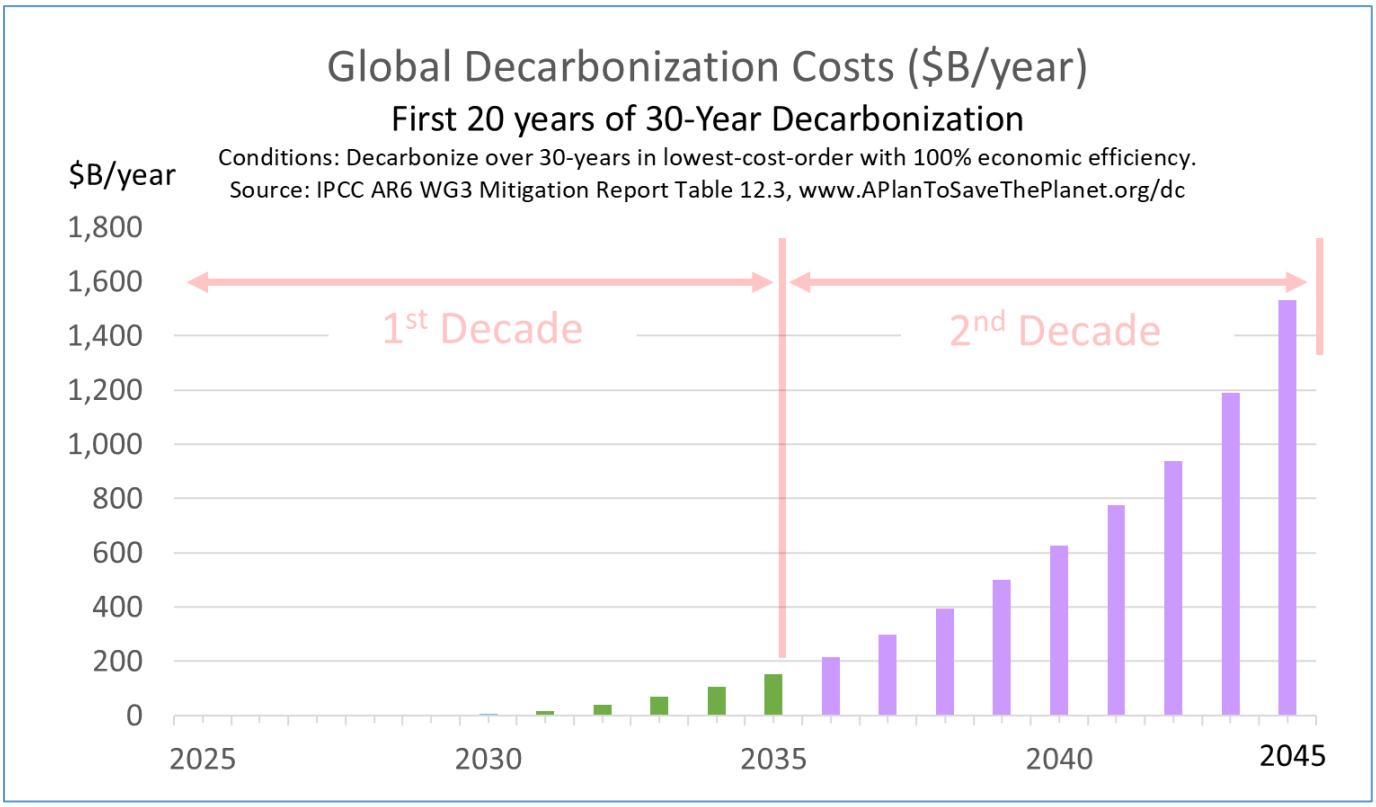
To get a sense,
of how this unfolds over time,
we plot {*} each decade,
{*} with a different {*} color.

{G} Their data covers,
40 billion tons,
out of a possible,
60 gigaton equivalents. {NG}

{*} Which means,
they are {*} giving us cost data,

{*} for the first 20 years,
of a 30-year,
decarbonization.

{*} The resulting,
global costs,
are shown here.




As one can see,
{*} the early years are easy,
while {*} the later years,
are,
less easy.

More specifically,
{*} the first 5 years,
have no cost,
{*} since this is referenced,
in their report.

{*} Also,
as one can see,
{*} costs increase,
EXPONENTIALLY.

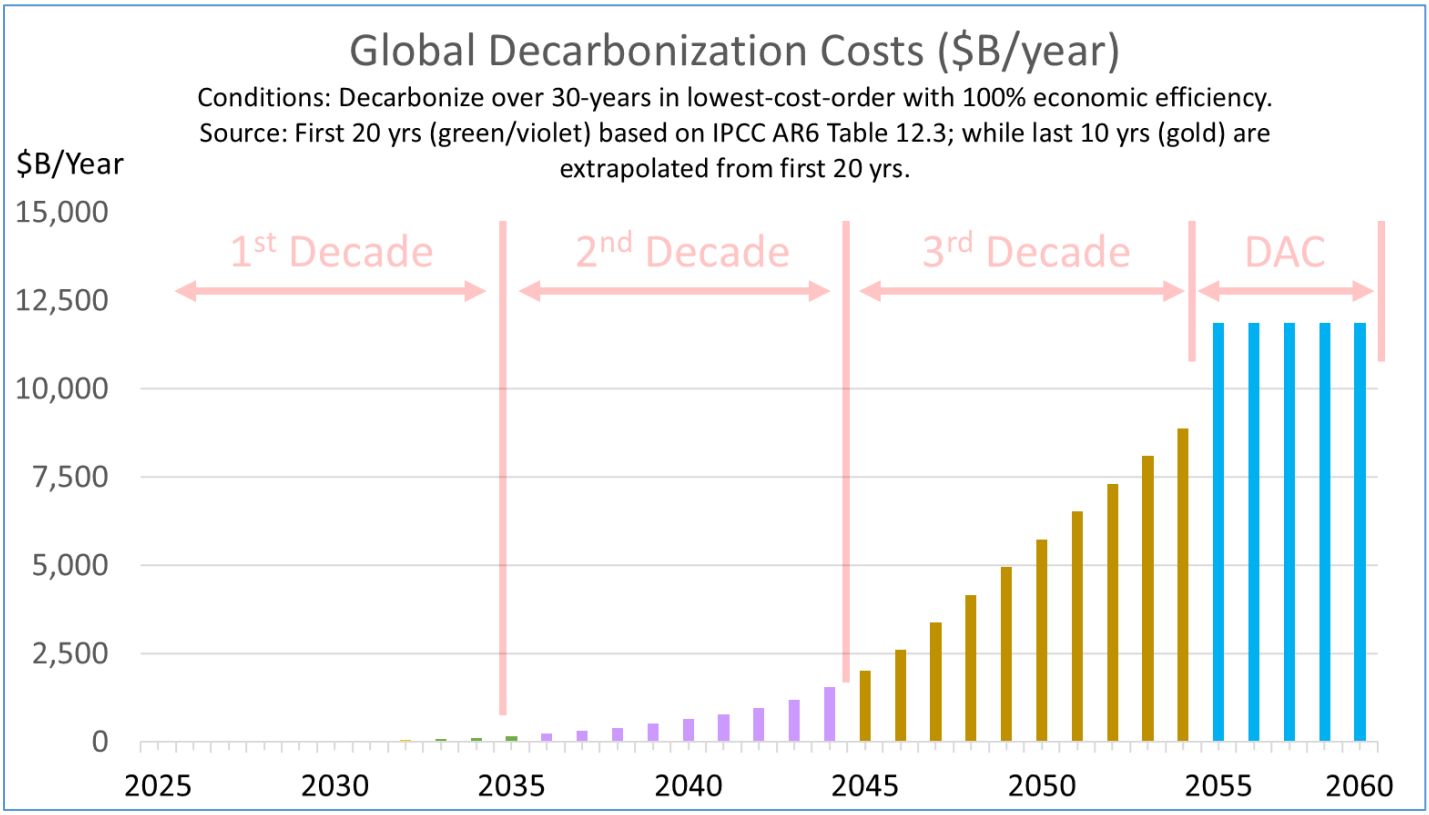
{*} This is bad,
and this will be addressed later,
in this,
video.

{G} In theory,
research can reduce the cost of Direct Air Capture,
from,
the current 1000 dollars per ton,
to
400 dollars per ton. {NG}

{*} Therefore,
to get {*} 3rd decade costs,
{*} we can extrapolate,
and limit to 400 dollars.

{*} Followed by,
Direct Air Capture.

The result,
in a sense,
is the world's,
climate plan.



And,
unfortunately,
it has several,
problems.

Problem number 1 {*} is,
these costs,
are prohibitively expensive.

And problem number 2 is,
no one is willing to pay {*} these costs,
even when {*} they are low.

We know this,
{*} because GLOBAL carbon dioxide emissions,
{*} keep going up.

{G} To better understand this,
we need to look at who might pay these costs, {NG}
{Video: signs / money / unrecognizable-wealthy-Caucasian} and WHY,
they might refrain,
from doing so.

{*} There are three primary sources,
of decarbonization money.

These are
{*} individual consumers,
{*} companies,
{*} and governments.

{G} So,
let's examine,
each of these,
one at a time. {NG}

## Individual Consumers

{Video: house / BBQ / woman at grill} Individual consumers,
do not benefit,
{SLOW} from reducing,
their own carbon dioxide emissions.

They are {VERY SLOW} too small.

{Video: city / highway / futuristic-urban-architecture} Instead, harm comes from, the {SLOW} **collective emissions**
{Video: city / pedestrians / silhouettes-of-a-crowd} of our planet's {SLOW} eight billion people.

{Video: activism / businessmen-talking}
For this reason, {SLOW} **each person**, wants {SLOW} **everyone else**, to reduce.

{G} In other words,
we cannot expect individual consumers,
to pay more for green products.

Especially,
at large scales. {NG}

## Companies

{G} We often encourage companies,
to reduce,
their emissions. {NG}

{Video: gov't / pensive-senior-businessman} But in practice, they face two choices.

{G} They can either decarbonize for real,
at high cost. {NG}

{Video: activism / irritated-woman-shows} Or, they can *appear to decarbonize*,
at less cost.

{Video: economics / stocks / motion-graphic-of} For publicly traded companies,
spending more on climate action,
usually means lower profit,
which can push stock prices down.

{Video: economics / CEO / thoughtful-man-look} But CEOs,
are expected,
to do the opposite.

{Video: economics / stocks /business-finance-technology} They are expected to increase profit,
and increase stock price.

So many respond {Video activism / Moscow-Russia-august} with token climate efforts,
designed to look good,
while keeping costs low.

## Governments

{Video gov't / world-countries-combine} Nations are dominated politically
{Video city / fuel / oil / aerial-view-of-vaporizing} by large industries
{Video activism / people-of-the-world} that employ **millions of people**.

{G} Examples are, {NG}
{*} the fossil fuel industry, {*} labor unions, {*} auto makers, {*} and factories.

{Video activism / Unrecogniazble-woman-putting-her-vote} Employees and their friends vote,
{Video signs / money / cartoon-fantasy-100} while employees, and companies, make political donations.

{Video gov't / the-business-team} To connect the dots,
lobbyists suggest to lawmakers,
that donations,
{G} are contingent,
on support,
for specific measures. {NG}

{Video: wind / portrait} Climate, in comparison, employs few people,
{Video: activism / two-brothers-sit} and is therefore, politically weak.

In a sense, {{Video: econ / gorilla / knuckle-gorilla} large industries are like political gorillas,
while {Video: econ / gorilla / adorable-monkey} climate is the small monkey.

{Video: activism / pro-wrestler} And,
as we know,
the strong,
sometimes take from,
the weak.

For example, {NG}

{Capital} the U.S. Inflation Reduction Act
{Video: power / solar / aerial-view-of-large-solar} **required** builders,
of solar farms
{Video: power / solar / eco-friendly-solar-panel-manufacturing} to buy U.S.-made solar panels,
to qualify,
for subsidies.

{G} While this created factory jobs,
it also raised the cost of solar farms — {NG}
{Video: reflect / carbon-dioxide-co2} ironically leading to,
higher carbon dioxide emissions.

{G} In other words,
labor hijacked,
the climate issue,
for their own purposes. {NG}

{Video: gov't / congressman-with-colleagues} It turns out,
only a tiny percentage of CLIMATE money,
that passes through GOVERNMENT,
{*} pays for

{*} lowest-cost,
decarbonization.

{G} For example,
the European,
carbon tax,
raises roughly 46 billion dollars a year. {NG}

{video / smoke / smoking-chimneys} And,
their emissions,
would decrease,
{video / signs / money / frustrated-businessman} roughly 2 to 1,
**IF**,
100% of that money,
{*} went to {*} lowest cost,
decarbonization.

{video / smoke / air-pollution-problems} However,
we observe,
little change,
in their emissions.

{Video / gov't / capitolus-dc-11032019}
The United States
Inflation Reduction Act,
{*} had a similar outcome.

{G} What does all this mean? {NG}

{*} Well,
if a monkey wants fruit,
controlled by gorillas,
he cannot expect,
much generosity.

{G} This is sometimes referred to {NG}
{*} as "The Political Gorilla problem."

REFERENCES

https://chatgpt.com/g/g-p-679d2bb5b304819198acec1a2830d008-energy-and-climate/c/69dfdc89-8ff0-83ea-a5c8-a36bad383991

https://ourworldindata.org/co2-emissions#:~:text=Carbon%20dioxide%20emissions%20are%20the,of%20contention%20in%20international%20discussions.

## Climate Plan

{G} Ok, let's review. {NG}

{Video / gov't / UN / united-nations} The United Nations Climate Planel says,
{*} the world needs to reduce,
carbon dioxide emissions.

{*} And they provide,
associated,
cost data.

{G} However, this has two problems. {NG}

{*} Problem number 1 is,
the costs are prohibitively expensive.

{*} And Problem number 2 is,
no one wants to,
pay them.

{video city / ped / city-people} This behavior is observed,
therefore,
we know,
it is real.

{G} Also,
one might add a 3rd problem,
which is, {NG}
{Video: activism / contemplative-man-thinking} no one seems to talk about,
problems 1 and 2.

{G} This begs the question, {NG}
{*} What is our,
Climate Plan?

Or,
more {*} specifically,

*What is an affordable plan,*
*that bends the global warming curve,*
*while not requiring behavioral changes from consumers,*
*companies,*
*and governments?*

{G} It turns out, {NG}
{*} there is a simple,
solution.

{G} It is to think of the climate problem, as two problems, {NG}
{Video scientists / nurse_holding} and do R&D,

to the extent required,
to resolve each.

{4 baths} One problem,
is {faucet} carbon dioxide emissions,
while {tubs} the other problem,
is global warming.

{G} We can {SLOW} solve the first problem, {NG}
{Video scientists / 736527_Man__Math_Professor} by doing R&D
{SLOW} to drive down the cost,
of 24/7 green energy,
{SLOW} to below that,
of fossil fuel.

{G} Consumers,
would then,
{SLOW} go green, {NG}
{Video signs / money / female-hands} to save money.

{G} And,
we can solve the second problem,
{SLOW} by doing R&D, {NG}
{video scientist / FRAME zoom-out-view-of-individuals} to determine {NG}
how to reflect sunlight back into outer space,
{SLOW} to cool the planet,
{SLOW} and offset global warming.

{G} One might refer to this surge in R&D,
as a "Climate Moonshot". {NG}

{Pic v20} For details, see Video Number 20.

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Do We Need a $10B Climate Moonshot? [#20]
https://www.youtube.com/watch?v=ihTGiOEKrns
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{G} Ok,
but how might we,
get a so-called "moonshot" started?

{Video: city / university / 6308217_Diversity} Well, in theory, a university could host a CONFERENCE that,
{Question} explores the following question:

*Is it possible, to solve the climate problem, with a surge of R&D, in key areas;*
*and if so,*

*what are those areas,*
*and how much might a "climate moonshot" cost?*

{Pic conference ideas} For an example conference outline,
visit the link,
shown here.

Climate Moonshot Conference (3-page PDF)
https://www.ma2life.org/g/moonshot/Climate_Moonshot_Conference.pdf

{G} Another way,
of getting a moonshot started is to {NG}
{Video: film / rear-view} produce a documentary film
that interviews top people,
and asks them what they would do with,
{Video: signs / money / 94402_Machine_printing} billions of dollars,
in R&D,
spending authority.

{Pic filmmaking ideas} For moonshot filmmaking ideas,
visit the link,
shown here.

Climate Film IDEAS (multiple ideas in one PDF)
https://www.ma2life.org/g/film/Climate_Film_Ideas.pdf

{G} When managing a project {NG}
{Pic Project tasks} one needs to determine,
where money comes from,
where it goes,
and what it does.

{G} If someone can answer these questions,
with a project,
that gets a moonshot started, {NG}
{Video: activism / 479180_Girl_Holding} they can potentially,
save the planet,
from climate change.

{Pic Call Glenn} If anyone would like to discuss,
their moonshot,
initiation,